

- Fig. 25. *Doris collatata*, dorso-lateral view.  
 26. ———, ventral view.  
 27. ——— *wellingtonensis*, lateral view.  
 28. ———, anterior part of ventral surface.  
 29. ——— *ravipilosa*, lateral view.  
 30. ———, ventral view.

## PLATE XXX.

- Fig. 1. *Acanthodoris mollicella*, lateral view.  
 2. ———, ventral view.  
 3. ———, spines of odontophore.  
 4. ———, mantle-spicules.  
 5. ——— *globosa*, lateral view.  
 6. ———, ventral view.  
 7. ———, spines of odontophore.  
 8. ———, bundle of mantle-spines.  
 9. ———, spines, from border of mantle.  
 10. *Doris prætenera*, latero-dorsal view.  
 11. ———, ventral view.  
 12. ———, three lingual spines.  
 13. ——— *mollipustulata*, dorsal aspect.  
 14. ———, ventral aspect.  
 15. ——— *pcculiaris*, dorsal aspect.  
 16. ———, ventral aspect.  
 17. ———, spicules of mantle.  
 18. *Chromodoris mollita*, lateral view.  
 19. ———, branchial apparatus, enlarged.  
 20. *D. delicata*, lateral aspect.  
 21. ———, dorsal aspect.  
 22. ———, ventral aspect.  
 23. *Hexabranhus orbicularis*, dorsal aspect.  
 24. ———, ventral aspect.  
 25. *Doridopsis australiensis*, lateral view.  
 26. ———, ventral view.  
 27. ——— *parva*, lateral view.  
 28. ———, ventral view.  
 29. ——— *obscura*, dorsal aspect.  
 30. ———, ventral aspect.  
 31. ——— *fumca*, dorsal aspect.  
 32. ———, ventral aspect.  
 33. ——— *inornata*, lateral aspect.  
 34. ———, ventral aspect.  
 35. ———, mantle-spicules.  
 36. ——— *subpellucida*, lateral view.

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March 20, 1877.

Dr. E. Hamilton, V.P., in the Chair.

Mr. Sclater called attention to an article published in the 'Oriental Sporting Magazine' for May 1876 (vol. ix. p. 176), by which it appeared that a two-horned Rhinoceros had been killed in February of that year about twenty miles south of the station of Comillah, in Tipperah, and expressed a hope that Mr. A. Manson, the author of the notice in question, would be induced to send home the skull of the animal (which he appeared to have preserved), in order to enable this part of *Rhinoceros lasiotis* (to which species the specimen

would doubtless belong) to be compared with skulls of *R. sumatrensis*. Mr. Manson had stated that the front horn of his specimen was  $8\frac{1}{2}$  inches high, the second merely a stud between the eyes.

Mr. Sclater remarked that this was the third<sup>1</sup> recorded occurrence of a Two-horned Rhinoceros north of the Bay of Bengal.

Mr. Sclater also called attention to the fact that Mr. W. Jamrach had just imported a young living specimen of the Rhinoceros of the Bengal Sunderbans, which was either *Rhinoceros sondaicus* or a very closely allied form<sup>2</sup>. Mr. Sclater had lately examined this animal, which was of the female sex, and measured about 3 feet in height. At this time of life there was certainly no appearance of a horn on the nose.

Mr. Sclater exhibited a small living Amphibænian (*Blanus cinereus*) which had been accidentally brought to England in the roots of a hot-house plant from Port St. Mary, Spain, and had been presented to the Society by John Goddard, Esq., Elmer Lodge, Beckenham.

The following papers were read:—

1. On the Mammals of Asia Minor. By CHARLES G. DANFORD, F.Z.S., and EDWARD R. ALSTON, F.L.S., F.Z.S.

[Received February 20, 1877.]

(Plate XXXI.)

The general lack of information as to the fauna of Asia Minor seems to render an apology unnecessary for the introduction of the following very imperfect list of the mammals known to inhabit that country.

In drawing up this catalogue, reference has been made to various notes which have appeared in our 'Proceedings'<sup>3</sup>, which relate chiefly to the districts of Trebizond and Erzeroum, and also to a few notices of animals in various books of travels<sup>4</sup>, especially in those of Mr. Ainsworth and M. Tchihatcheff. To these are added the animals either observed by Danford, or ascertained by him to occur in the country.

<sup>1</sup> One being that of the specimen of *R. lasiotis* now in the Gardens, and the second that recorded P. Z. S. 1875, p. 566.

<sup>2</sup> See P. Z. S. 1876, p. 751.

<sup>3</sup> E. T. Bennett, "Observations on several Mammalia from Trebizond and Erzeroum," P. Z. S. 1835, pp. 89, 90. E. D. Dickson and H. J. Ross, "Notes accompanying a Collection of Birds (&c.) from Erzeroum," P. Z. S. 1839, pp. 119-123. C. G. Danford, "Notes on the Wild Goat (*Capra agagrus*, Gm.)," P. Z. S. 1875, pp. 458-468.

<sup>4</sup> Of these we may mention:—Ainsworth, 'Researches in Assyria, Babylonia, and Chaldea' (London, 1838); Spratt and Forbes, 'Travels in Lycia' (Lond. 1847); Baker, 'Lares and Penates' (Lond. 1853); Curzon, 'Armenia' (Lond. 1854); Tchihatcheff, 'Asie Menerre' (Paris, 1856); and Kotschy, 'Reise in d. Cilicischen Taurus' (Gotha, 1858).



J Smit lith

M&N Hanhart imp.

MUS MYSTACINUS





The districts which he had an opportunity of becoming personally acquainted with are as follows:—

1. The neighbourhood of Ismid, at the head of the gulf of the same name.
2. The low country to the south-east of Smyrna nearly to Denizlû, especially the valleys of the Greater and Lesser Meander.
3. The bushy plains at Adalia, and part of the mountainous district of Lycia near that port.
4. The high wooded mountain-ranges of the Bulgar Dagh and Ala Dagh, in the Cilician Taurus.
5. The country which lies between these mountains and the Black Sea, and which, with the exception of a few oak-scrub- and forest-covered ranges near the shores of the latter, consists principally of a barren undulating plateau, having a mean elevation of about 3500 feet.

The time spent in most of these localities was short; and the season of the year at which they were visited was either winter or early spring.

Both these facts argue strongly against the list being at all an exhaustive one, especially as regards the Bats, Insectivores, and Rodents, many more species of which will doubtless be found to inhabit the country. This paper, therefore, must be taken merely as a contribution to our knowledge of the mammalian fauna of Asia Minor.

With regard to the distribution of the species in adjoining countries, we have consulted Geoffroy St.-Hilaire for Greece<sup>1</sup>, Kotschy for Cyprus<sup>2</sup>, Pallas<sup>3</sup> and Ménériés<sup>4</sup> for the Caucasus, Canon Tristram for Palestine<sup>5</sup>, Mr. Blanford for Persia<sup>6</sup>, and Dr. Severtzoff for Turkestan<sup>7</sup>.

The species of which specimens were brought home are marked with an asterisk; those of which the evidence of occurrence seems doubtful are not numbered and are enclosed in brackets.

1. \**VESPERUGO SEROTINUS* (Schreber).

Common in the central districts. Some specimens were obtained at the village of Issa-fakyr, near Yuzgat. There is a range of low rocky hills here, on which grows a little oak-scrub, and by the roadside are a few orchards, vineyards, and willow trees.

This was the only Bat obtained, although many other species will doubtless be found to occur.

2. \**CROCIDURA LEUCODON* (Herm.).

Common in the mountains. It has been found in the Caucasus by Eichwald, and in Turkestan by Dr. Severtzoff. According to

<sup>1</sup> Expéd. Scient. en Morée, Zoologie, pp. 10-18.

<sup>2</sup> Unger und Kotschy, Die Insel Cypern, p. 570.

<sup>3</sup> Zoogr. Rosso-Asiat. vol. i.

<sup>4</sup> Catalogue Raisonné, pp. 16-25.

<sup>5</sup> P. Z. S. 1866, pp. 84-93.

<sup>6</sup> Eastern Persia, ii, pp. 18-97.

<sup>7</sup> Turkestantanskie Jevotnie (the Mammal portion translated by F. C. Craemers, Ann. & Mag. Nat. Hist. xviii, pp. 40, 168, 208, 325, 377, 1876).

Canon Tristram, the common Shrew of North Palestine is *C. aranea* auct.<sup>1</sup>; and closely allied (if distinct) species have been described from Persia and Georgia.

### 3. ERINACEUS EUROPÆUS, Linn. ?

A Hedgehog which is not uncommon in various parts of the country probably belongs to this species, which is known to inhabit the Lebanon and the Caucasus; but specimens obtained in the Smyrna district on Danford's visit to the country were not preserved.

### 4. FELIS UNCIA, Schreb. *Kaplan*.

Not common, but generally distributed in the mountains near Smyrna and on those bordering the southern coasts. The Ounce of Asia Minor was specifically separated by Valenciennes under the name of *Felis tulliana*<sup>2</sup>, but our friend Mr. D. G. Elliot, who has examined the typical specimens, can find no trustworthy distinctive characters.

This animal, though generally very shy, sometimes shows great daring. On one occasion, after firing several shots at a small herd of Wild Goats, Danford was following up a wounded male, which shortly afterwards fell over a cliff. To reach the spot where he lay, a circuit had to be made, which took not more than ten minutes; but on coming to the place nothing remained but a pool of blood and a few handfuls of hairs; the tracks of two Ounces were easily discernible in the patches of snow; nor did he ever see any thing more either of the Goat or the thieves. The natives both trap and shoot Ounces, and great value is set upon their skins.

### 5. \*FELIS CATUS, Linn. *Yaban kedi* (Wild Cat).

A male and female of this species were obtained among the rocks near Zebil, at an elevation of 3000-4000 feet. The natives say they are not uncommon. Their principal food appears to be a species of Mouse (*Mus mystacinus*, see p. 279), of which no less than fourteen were found in the stomach of one of the Cats trapped. In these skins the ground-colour is of a clearer grey, and the dark markings of the flanks are much more broken up into distinct spots, than in European examples of the species.

### [\*FELIS LYNX, Linn.

A fine skin obtained in Constantinople, and stated to be from Asia Minor, is nearly uniform light rufous above, with obscure spots on the flanks, and markings on the limbs hardly darker than the colour of the back; the terminal third of the tail is black. It agrees well with Blyth's *F. isabellina*<sup>3</sup> from Tibet; but we do not think that the form is more than a variety of *F. lynx*, which has

<sup>1</sup> *Sorex russulus* (Zimm.), not *S. araneus*, Linn.

<sup>2</sup> Compt. Rend. Ac. Paris, xlii. p. 1035. Figured by Tchihatcheff, As. Min., Zool. pl. i.

<sup>3</sup> Journ. As. Soc. Beng. xvi. pt. ii. p. 1178.

7 skins,

from marshes in

Asia Minor

Danford 14/7/79

long been known to inhabit the Caucasus, and which Dr. Severtzoff found in Turkestan at a considerable elevation.]

6. \**FELIS PARDINA*, Temm. *Ushak*.

Rare. A small skin was procured, and a very fine one seen at Kaisariyeh. Canon Tristram has doubtfully referred the *Wushak* of the Arabs of Palestine to this species, which is also said to be common in European Turkey. In Asia Minor it appears to be generally much rarer than the Caracal, although Ainsworth records that no fewer than eight individuals were observed by his party in one day on Tchokúr Ovah, near Missisáh (Missis?).

7. \**FELIS CARACAL*, Linn. *Kara koulak* (black-ears).

Skins were procured from the neighbourhood of Smyrna, where the Caracal is said to be tolerably common. Of these an adult is much grizzled in colour, owing to the development of the whitish tips of the hairs. Danford also met with it in the Taurus, where, as already observed, it is certainly the commonest species of Lynx.

8. \**HYÆNA STRIATA*, Zimm. *Zyrtlan*.

Not uncommon near Smyrna and in the southern districts. A specimen was procured at the village of Ortakkeui, between Nazlû and the ruins of Hierapolis. Ainsworth mentions that a white variety was observed by the Euphrates Expedition.

[*GENETTA VULGARIS*, Less.

The Genet is mentioned by Ainsworth as inhabiting the Taurus. It was not met with by Danford; but specimens taken by Canon Tristram in Palestine are in the British Museum.]

9. \**HERPESTES ICHNEUMON* (Linn.). *Yer kiopek* (earth-dog).

One specimen only of this animal was procured; it was shot among the reeds on a small stream which flows into the Kutchuk Mendere (little Meander), not far from Ephesus. It is no doubt not uncommon in many localities; in Palestine Canon Tristram found it in incredible numbers.

10. \**CANIS LUPUS*, Linn. *Kurt, Yanovar*.

Generally common throughout the country. The Black Wolf, separated by Schreber as *C. lycaon*, appears to occur in the mountains of the south-eastern districts; for Tchihatcheff saw some skins in the Antitaurus, in the house of a Turkish hunter, who assured him that he had killed the animals himself, and Black Wolves were seen by the Euphrates Expedition on the banks of the Sajúr.

11. \**CANIS AUREUS*, Linn. *Schakal*.

Generally common, especially in the south.

12. \**CANIS VULPES*, Linn.? *Telki*.

Common in the mountains of the Taurus, and generally distributed.

buted throughout the country. It was even met with on the barren plateau of the interior.

An imperfect skin brought home is extremely pale in colour and long in the fur, that of the lower parts being light smoky grey; and these characters were constant in all the individuals which Danford observed. It very much resembles the type of *Vulpes flavescens*, Gray<sup>1</sup>, originally stated to be from Persia, with which Canon Tristram doubtfully identified the Fox of Northern Palestine. But Gray subsequently identified his species with Indian specimens, and there appear to be doubts as to the locality of the type<sup>2</sup>. With the imperfect material at our command, we think it safest for the present to regard the Fox of Asia Minor as a pale long-haired race of *C. vulpes*.

### 13. \*MELES TAXUS (Schreb.). *Porsook*.

Appears to be not uncommon among the mountains. Specimens were obtained at Zebil in the Taurus; the fur of one brought home is as pale-coloured as that of the Persian Badger separated by Mr. Blanford as *M. canescens*<sup>3</sup>. Its skull also agrees with that of his type specimen in having two lateral ridges on the hinder part of the palate; but in other respects it rather resembles European examples, and the last upper molar is even broader than in many of the latter, measuring  $\cdot 50 \times \cdot 58$  in. At present, therefore, we cannot help regarding the claim of *M. canescens* to specific distinction with grave suspicion.

“The Ratel” is mentioned by Ainsworth as an inhabitant of the Taurus, and a species of *Ratelus* is said by Schmarda to be found in Mesopotamia; but Mr. Blanford has suggested a possible confusion with the somewhat similarly coloured Badger.

### [ICTONYX ZORILLA (Thunb.).

We introduce this species on the authority of Mr. Keith Abbott, who sent home a specimen which had been forwarded to him alive from the neighbourhood of Erzeroom, where he states it is called *Gheurjen*. Mr. Bennett says that this example scarcely differed from a North-African specimen. As far as we are aware, this is the only record of the existence of the Zorilla in Asia Minor; and it has not yet been found in Palestine.]

### 14. \*MARTES FOINA (Linn.). *Samsar*.

Tolerably common among the mountains. The skins are in great request, and cost considerably more than in England. Some specimens were obtained in the Taurus; and Ainsworth mentions it as inhabiting the Chamkú Bel and Kará Bel mountains. His “Sable” is probably either this species or *M. abietum*.

### 15. \*MUSTELA VULGARIS, Linn.

A specimen, shot on the 28th March among the débris of stones

<sup>1</sup> Ann. & Mag. Nat. Hist. xi. (1843), p. 118.

<sup>2</sup> Cat. Carn. &c. Mamm. (1869), p. 203. Cf. Blanford *tom. cit.* p. 40.

<sup>3</sup> Ann. & Mag. Nat. Hist. xvi. (1875), p. 310; Eastern Persia, ii. pl. iii.



on a hill-side near Anascha, in the Taurus, at an elevation of about 4000 feet, is pure white, excepting a patch on the top of the head and a few hairs on the extreme tip of the tail. From the surprise evinced by the natives it appeared that such examples are very uncommon; but Ménériés records that "M. le Docteur Conradi en tua une variété blanche près des eaux du Caucase en janvier." Our specimen is large, with a proportionally long tail, as in the Italian race separated as *M. boccamela*.

[? *MUSTELA SARMATICA*, Pall.

Ainsworth says that "a *Mustela*, perhaps *M. sarmatica*, is found on the plains;" and Kotschy speaks of having seen "*Viverra sarmatica*," but did not obtain specimens. Danford saw various Weasels without being able to identify them with certainty.]

16. \**LUTRA VULGARIS*, Erxl. *Su-itti* (water-beast), *Kundush*.

Not uncommon, especially on the trout-streams of the Taurus. Specimens procured on the Cydnus differ in no way from the ordinary English animal, except in being perhaps slightly lighter in colour. In the Caucasus Ménériés suspected the existence of a second species, of which the fur was said to be lighter in colour and more valuable than that of the Common Otter. The "Grey Beaver, or *Kondoöz*," which Mr. Curzon mentions as inhabiting Armenia, is evidently merely the Otter.

17. \**URSUS ARCTOS*, Linn. *Aiyee*.

Generally common among the mountainous coast-districts, especially in thickly wooded regions bordering on the Black Sea. Great numbers of skins are exported from Ineboli. Not having been able to obtain a specimen on the southern side, we can make no precise statement as to the occurrence of the ordinary Brown Bear in that part of the country. The natives say that there are both brown and grey Bears, the latter being sometimes almost white. One seen near Mersina was very dark in colour; the wetness of the day, however, may have had something to do with this. Should both forms be here found together, there will be strong reason for regarding the following as merely a climatic variety of *U. arctos*.

18. *URSUS SYRIACUS*, Ehrenb. *Aiyee*.

Common in the south-east. A specimen brought to us at Gozna, near Mersina, which had been shot a few days before our arrival, had the colouring characteristic of the Syrian form.

[*PHOCA*, sp. ?

A Seal observed off the island of Rhodes was doubtless either *P. monachus*, Herm., or *Ph. vitulina*, Linn.]

19. *SUS SCROFA*, Linn. *Domoöz*, *Yaban domoöz* (wild pig).

Very common throughout the country wherever a sufficient cover of forest-bush or reed is to be found.

20. \*CERVUS ELAPHUS, Linn. *Süyün.*

Common in the thickly wooded districts of the north-west. Many stags' heads seen at Ismid near Constantinople appeared all to belong to the usual type of *C. elaphus*. It also occurs on the southern side of the Cilician Taurus, and appears to be more numerous on the Kermesdagh and in the neighbourhood of Marasch. Herr Kotschy alludes to "the yet unknown Stag of the wide Pyramus woods," near which river Danford has been since informed that they are to be met with. Some horns seen at Kaisariyeh, and a pair in our possession alleged to come from the latter districts, are of great size compared with those of animals killed in the north.

21. \*CERVUS DAMA, Lana. *Yamoorcha.*

Common on the plains of the south coast and in the lower elevations of the mountains bordering upon them. At Adalia Danford met with the Fallow Deer, among the bushy scrub, within a mile of the town. According to Ainsworth, they are especially common on the Kará Bel and Chamkú Bel Mountains.

22. \*CERVUS CAPREOLUS, Linn. *Karadja.*

Generally distributed in the wooded districts, but more common in the north than in the south. Its existence in the Lebanon has recently been established by Canon Tristram and Professor Newton<sup>1</sup>. The horns seem to correspond with the European form; but the skin appears to differ in the length and texture of the hair, that of a specimen killed in the Cilician Taurus being shorter and finer.

23. GAZELLA DORCAS (Linn.). *Jairan.*

Not uncommon on the plain of Tehukur-ova and about Tarsus and Adana. Ainsworth says that this species is replaced on the Tigris, near Kút Aamárah, by *G. subgutturosa*.

24. \*CAPRA ÆGAGRUS, Gmel. *Kayech.*

Common throughout the Taurus and Armenia, but not found in the west or north of the country, or on the isolated Mount Argæus, near Cæsarea. Its vertical range extends from the mountain-summits to (in some districts) the sea-level. For fuller notes on this species as observed by Danford in Asia Minor see P. Z. S. 1875, pp. 458-468.

25. \*OVIS GMELINI, Blyth. *Kotch, Yaban köyun* (wild sheep).

Common in many districts of the interior, particularly about the salt lakes in the Vilayet of Konia. It is also found in the elevated plain of Palanga, above Marasch, and thence ranges east and north to Kurdistan and Armenia. It is somewhat remarkable that Danford could find no trace of this animal either in the country to the north of the Ala Dagh or on the wide-reaching grassy plateau between Kaisariyeh and the Black Sea.

It seems hardly ever to occur on the southern slopes of the

<sup>1</sup> P. Z. S. 1876, pp. 420, 701.

Taurus, preferring the barer districts of the north. Herr Kotschy, otherwise so accurate in his observations, must have been misled into stating that ten to twenty Wild Sheep are killed yearly at Gullek, as at that place, which is situated on the south side of the Bulga Dag, we were assured that the species is not found.

Specimens were obtained from the district of Eregli, where they are common, and frequent the salt-licks in large flocks. Winter is the easiest time of the year to get at them, the deep snow which generally covers that part of the country impeding their movements. At other times they are shy, and, owing to the scarcity of cover, very difficult to approach. The severe winter of 1873-74, which was so fatal to the tame breeds of Sheep, also destroyed a great number of the wild species.

Gmelin's Sheep is a very graceful animal, deer-like in its appearance, having long fine limbs, and in the male a thick bushy throat.

The general colours of specimens procured in the middle of March are :—

♂ 4-5 years old. Head, neck, back, and sides, russet-yellow; belly and underparts of legs white; space before the eye, nose, chin, and undersides of the ears whitish; a dark purple-brown mark above the knee on the fore legs, and a darkish line on the chest; the ridge of the neck and back somewhat darker than the rest of the back; neck thick and bushy.

Total length 53 inches, tail 5 inches, ear 4.25 inches, height at shoulder 33 inches.

♀ 2½ years (by mark of mouth). Colour the same as in the male, but markings less decided. No bushy neck and no horns.

Total length 48 inches, height at shoulder 22.5.

Sir V. Brooke considers that the above-mentioned individuals are not sufficiently old to show the typical markings, specimens which he has received from Ararat being much ruddier and having a white saddle-mark. He also expresses his surprise at the female being without horns.

26. \**SCIURUS SYRIACUS*, Hempr. & Ehr. *Dereek, Kallay.*

Generally common, especially among the oak- and beech-woods of the lower mountains. This Squirrel is very abundant in Northern Palestine; but its range does not appear to extend to the Caucasus, where *S. vulgaris*, Linn., is stated by Eichwald to abound. *S. fulvus*, Blanf., from Persia, is closely allied to the present species.

27. \**SPERMOPHILUS XANTHOPRYMNUM* (Bennett).

Exceedingly common through the whole of the steppe country of the interior through which Danford passed, the ground being in some districts perfectly honeycombed with their holes. They have a loud sharp whistle, and are very much on the alert, seldom straying far from their burrows. It is doubtless to this animal that Mr. Curzon refers under the name of "Lemming."

The Souslik of Asia Minor was described by Mr. Bennett under the name of *Citellus xanthoprymnus*, from a specimen sent to this



Society by Mr. Keith E. Abbott from Erzeroom (now in the British Museum)<sup>1</sup>. It was doubtfully referred to *S. musicus* of Ménétriés by Prof. Brandt; and this identification has been generally followed in spite of Brandt's concluding observation:—" *C. xanthoprymnus*, Bennett, vix a *Spermophilo musico diversus*." <sup>2</sup> But the animal, of which we have a good series, proves to be quite distinct both from *S. musicus* and from *S. concolor*, with which Bennett compared it, belonging to the division of the genus with well-haired soles. It is much nearer the European *S. citellus* (Linn.), to which it was referred by Ainsworth, but is at once distinguished by its colour and by the shortness of its tail, which hardly exceeds the hind foot in length. As Bennett gives but a short diagnosis, and the species has since been generally overlooked, we add a fuller description.

Ear rudimentary, soles of hind feet hairy, tail short, hardly longer than the hind foot.

Upper parts nearly uniform reddish buff, most of the hairs slate-grey at the base, then whitish, then broadly tipped with light fulvous; these are mixed with black hairs, which are more numerous in some individuals than in others. Tail cylindrical, unicolorous, more brightly fulvous than the back. A ring round each eye, the edges of the lips, chin, and throat whitish, passing into the pale isabelline of the breast and belly. Legs and feet more distinctly fulvous. Approximate measurements (in skin):—

	inches.
Length of head and body (about) . . . . .	9·50
„ tail . . . . .	1·40
„ hind foot . . . . .	1·40

The only recent writer who has recognized the validity of this species is Dr. Severtzoff, who, on his visit to London, identified with *S. xanthoprymnus* certain Sousliks which he had formerly referred to *S. fulvus*, Licht.<sup>3</sup> He says that these specimens were obtained by him near Tashkent and Cheenaz, and by Russoff near Samarkand. If his identification is correct, the range of the species will probably be found to extend through Northern Persia.

#### [ARCTOMYS, sp. ?

Ainsworth states that *A. marmotta* (Linn.) inhabits the Taurus; but *A. bobac*, Schreb., seems more likely to occur there. No Marmot was met with by Danford.]

#### 28. \*MYOXUS DRYAS (Schreb.).

A single specimen was procured at Issa-fakyr, in the interior. Its nest was a round ball of dry grass, and was placed in a dense bush of wild rose. It was once or twice disturbed from this retreat, and was eventually secured by firing at the nest. This example is somewhat remarkable in coloration, the whole back from the nape

<sup>1</sup> P. Z. S. 1835, p. 90.

<sup>2</sup> Bull. Ac. Petersb. 1844 (ii.) p. 371.

<sup>3</sup> Ann. & Mag. Nat. Hist. 1876, xviii. p. 388.

to the tail being strongly washed with bright rufous. Measurements (in spirits):—

Length of head and body . . . . .	inches.
„ tail . . . . .	4.25
„ ear . . . . .	(imperfect.)
„ hind foot . . . . .	0.45
	0.85

These dimensions considerably exceed those usually quoted; but a specimen of the normal colour in the British Museum (collected by Mlokosievicz in Georgia) is nearly as large. This latter example shows a tendency to yellowish rufous below the ear. Altogether we are inclined to believe that this rare Dormouse will be found to be very variable in colour (as Alston has shown to be the case with *Graphiurus murinus*<sup>1</sup>); and we cannot help feeling very doubtful as to the specific validity of Mr. Blanford's Persian *M. pictus*<sup>2</sup>, especially as our Asia-Minor animal has a hind foot proportionally smaller than those of his type specimens.

Ainsworth says that "the Great and Common Dormice" are found in the mountain-forests, probably meaning *M. glis* (Linn.), which is found in the Caucasus and Georgia, and the present species.

[*MUS RATTUS*, Linn.

The late Mr. Bennett described a Rat sent by Mr. Keith Abbott from Trebizond, under the name of *M. latipes*<sup>3</sup>. It has been doubtfully referred by Giebel to *M. alexandrinus*, Geoffr.<sup>4</sup>; but Bennett's diagnosis appears to accord best with the common Black Rat, which is known to inhabit the Caucasus and Georgia.]

29. *MUS DECUMANUS*, Pall.

This species is stated by Ainsworth to be the common Rat of the country.

30. \**MUS MUSCULUS*, Linn. *Sytchan*.

Common in buildings everywhere. One brought home is rather small in size and light in colour, the belly especially being very pale.

31. \**MUS SYLVATICUS*, Linn. *Yaban sytchan* (wild mouse).

Probably common. A specimen was caught while running about on the surface of the deep snow, considerably above the tree-growth. Ménétriés obtained this species in the mountains of Talyche, and Canon Tristram on the plains of Palestine.

32. \**MUS MYSTACINUS*, sp. n. *Dagh sytchan* (mountain-mouse). (Pl. XXXI.)

Ears moderate, nearly naked, when pressed forward they do not reach the eye. Whiskers very long. Tail nearly as long as the head and body, or even longer, sparsely haired except towards the tip. Upper parts mouse-grey, washed with black along the back,

<sup>1</sup> P. Z. S. 1875, p. 317.

<sup>2</sup> Ann. & Mag. Nat. Hist. xvi. (1875) p. 311; East. Persia, ii. pl. iv. fig. 2.

<sup>3</sup> P. Z. S. 1835, p. 89.

<sup>4</sup> Algern. Zool. p. 555.

and passing into fawn-colour on the flanks; behind each ear an oval patch of pure fawn. Snout, lips, lower cheeks, underparts, and feet pure white, the line of demarcation well marked, and the dark colour of the outer side of the limbs not reaching to the carpal and tarsal joints. Whiskers mixed black and white; tail distinctly bi-coloured, dusky above, white below. All the fur dusky at base. Measurements of two adult males (in spirits):—

	inches.	inches.
Length of head and body . . . . .	4·75	4·45
„ ear . . . . .	·60	·60
„ longest whiskers . . . . .	2·00	1·70
„ tail . . . . .	5·05	4·30
„ hind foot . . . . .	1·00	1·00

This Mouse, which we believe to be undescribed, differs from the last species in its shorter naked ears, much larger size, and different coloration. In the latter respect it approaches *M. albipes*, Rüpp., of Abyssinia<sup>1</sup>, from which, however, it is at once separated by the differences of its size and proportions. It was common at Zebil, in the Bulgar Dag, on the rocky bushy hill-sides, at an elevation of 3000–4000 feet. Three specimens preserved are all adult males, and do not differ from one another except in the proportional length of their tails.

Ainsworth says, “The Mouse observed at Bír was an undescribed species;” possibly it may have been the present one.

33. *CRICETUS FRUMENTARIUS*, Pall.

Herr Kotschy states (*tom. cit.* p. 234) that when he visited the river Cydnus the inhabitants complained of the damage done that year to their grapes by Bears and Hamsters, and that a specimen of the latter which he obtained was identified at Vienna with the European species. It is also included in Ainsworth’s list under the name of *C. vulgaris*; but the only Hamster met with by Danford belonged to the next species.

34. \**CRICETUS NIGRICANS*, Brandt.

One of these curious little animals was brought to Danford by his retriever, who was evidently much puzzled as to what he had got hold of. Its cheek-pouches were closely stuffed with some green clover-like food. The locality where it was found was between the villages of Buroon-kysla and Jazli-tash, about the centre of the long stretch of undulating steppe country, covered with dried grass and stones, which lies to the north of Kaisariyeh. The measurements of this example (a female, in spirits) are:—

	inches.
Length of head and body . . . . .	6·25
„ tail . . . . .	·60
„ ear . . . . .	·50
„ hind foot . . . . .	·70

<sup>1</sup> Mus, Seuckenb. iii. p. 107.

This Hamster, which is rare in collections, was discovered in the Caucasus by Ménériés. It has since been found in Persia by De Filippi, and in Bulgaria by Mr. T. E. Buckley, as recorded by Prof. Newton, who gives a very good figure of the animal <sup>1</sup>.

35. *CRICETUS ACCEDULA* (Pall.).

Examples of this species were sent home by Messrs. Dickson and Ross from Erzeroom, with the observation that the species is there "very common. The eyes are large and black; cheek-pouches spacious, extending from the angles of the mouth to the back of the head, a little beyond the ear. It is one of our domestic mice. In winter it is sometimes found on the snow; its fur is then silky and glossy"<sup>2</sup>. Apparently this is the *Cara-guz* ("black-eyes"), which Mr. Curzon describes as a grey animal, the size and shape of a young Guineapig.

36. \**SPALAX TYPHLUS*, Pall. *Kior Sytchan* (blind rat).

Common in many places, as has been recorded by Ainsworth and by Dickson and Ross.

[? *ALACTAGA DECUMANA* (Licht.).

A Jerboa, mentioned by both Herr Kotschy and Mr. Curzon, but not met with by Danford, may probably prove to belong to this species.]

37. \**HYSTRIX CRISTATUS*, Linn. *Kipri*.

Common in the Taurus, at various elevations, from the plain to 5000 feet. Danford trapped one among the rocks near Zebil, in the Bulgar Dagh, and frequently observed traces of them near Smyrna, and in the island of Rhodes.

38. \**LEPUS SYRIACUS*, Hempr. & Ehrenb. *Tauochan*.

Common everywhere on the coast districts, but not met with by Danford in the barren interior. It ranges in the Taurus from the sea-level to about 5000 feet. Two specimens shot in the latter district agree well with the original description in the 'Symbolæ Physicæ.' The underwool of the flanks is exactly as there described; but that of the back is pure white, and the fur round the rump is almost pure grey, the hairs being dusky, with white tips, but with no rufous band. These differences appear to us to be probably owing to difference of climate, the specimens having been obtained in winter. According to Canon Tristram, this is the only Hare found in the greater part of Palestine, except in the south and south-east, where it is replaced by *L. sinaiticus*, H. & E., and *L. ægyptiacus*, Geoffr.

<sup>1</sup> P. Z. S. 1870, p. 331, pl. xxvi.

<sup>2</sup> P. Z. S. 1839, p. 122.



2. On the Myriopoda obtained by the Rev. G. Brown in Duke-of-York Island. By ARTHUR GARDINER BUTLER, F.L.S., F.Z.S., Assistant, Zoological Department, British Museum.

[Received March 2, 1877.]

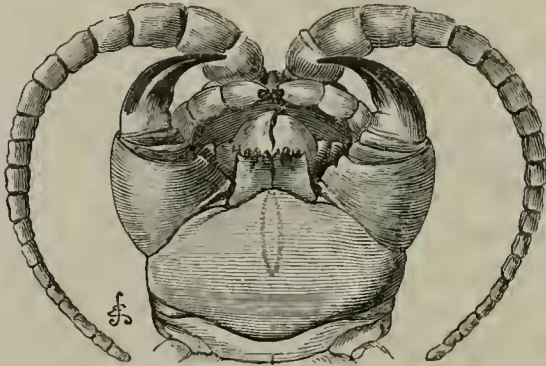
Only two species of Myriopods were sent home, both of them allied to, but distinct from, previously described species.

#### CHILOPODA.

#### HETEROSTOMA, Newport.

#### HETEROSTOMA BROWNI, n. sp.

Above brownish olivaceous, with violet reflections, hind borders of the segments dark greenish; antennæ and legs (excepting the femoral and sometimes the tarsal joints of young examples) green; body below testaceous; anal appendices tawny; labial teeth eight, smooth, acutely conical, the central pair on each side very powerful; basilar joint of posterior legs somewhat depressed (not carinated),



*Heterostoma browni.*

with five short acute spines on the supero-interior margin and six on the inferior surface; lateral anal appendices long (9 millimetres), cylindrical towards the base, acuminate and bidentate at the tip, coarsely punctured, with two minute denticles above near the tip, and two others near the centre of the infero-exterior margin. Length of adult specimen, exclusive of posterior legs, 4 inches; length of posterior legs 1 inch.

Allied to *H. sulcidens* of Newport from Paramatta, but with the segments more parallel, the spines on the posterior pair of legs shorter and placed at more regular intervals from one another, the lateral anal appendices rather longer and considerably less spinose, and with eight instead of six teeth on the lower lip.

CHILOGNATHA.  
SPIROBOLUS, Brandt.

SPIROBOLUS CINCTIPES, n. sp.

♀. Reddish tawny, with the hind borders of the segments blackish; legs and antennæ grey, banded with white: a linear impression down the centre of the head; first segment rounded at the lateral angles, with a marginal ridge, not striated; remaining segments with lateral irregular striations; preanal segment subspinose behind, not extending to a level with the extremity of the anal valves; fifty-five dorsal segments; preanal plate subtriangular, compressed; antennæ short, thick, with all the joints excepting the last of nearly equal length, the last joint forming a terminal button; eyes in a rounded subtriangular mass, blackish, grouped in six rows; 103 pairs of legs; length 3 inches 10 lines.

Allied to *S. gaimardi* of Gervais from New Ireland, but with a greater number of segments and legs, and very different coloration. Several examples of this species were obtained; but, unfortunately, all but one were broken beyond the possibility of rearrangement of the parts: the type, being much larger than the others, and being merely separated in the middle, was easily readjusted.

3. On some Spiders collected by the Rev. George Brown in Duke-of-York Island, New Britain, and New Ireland.  
By the Rev. O. P. CAMBRIDGE, M.A., C.M.Z.S.

[Received March 12 1877.]

I am much indebted to the Secretary of the Zoological Society for the opportunity of examining a few Spiders collected, among numerous other natural-history objects, by the Rev. George Brown in Duke-of-York Island, New Britain, and New Ireland. Two of these spiders, an *Argiope* (family *Epeirides*) and a *Sarotes* (family *Thomisides*) appear to me to be undescribed; and upon the former I have taken the liberty to confer Mr. Brown's name. Another of the Spiders, a very distinct and handsome *Gasteracantha* (*G. panisicca*, Butl.), has been already described, but only from dried examples, which must have wholly lost their characteristic colours and markings; I have therefore subjoined a description of its colours and markings from Mr. Brown's specimens. The remaining Spider is one of those gigantic *Nephilæ* (specially characterized by two small tubercular eminences on the middle of the cephalothorax) of the orbicular snares of which most natural-history collectors in exotic regions bring home startling accounts, but of which scarcely any collectors have yet been sufficiently observant to detect the minute males. This, however, is the sex in which the araneologist expects to find the most conclusive specific characters; and, indeed, until the males come to hand, it is often exceedingly difficult to give a reliable opinion upon the specific identity of these and many other Spiders.

Family EPEIRIDES.  
Genus NEPHILA, Leach.

NEPHILA CHRYSOGASTER.

*Epeira chrysogaster*, Walck. Ins. Apt. ii. p. 92.

*Nephila chrysogaster*, Cambr. P. Z. S. 1871, p. 620, pl. xlix. figs. 3, 4.

Numerous examples of this enormous Epeirid were contained in Mr. Brown's collections. It is most probably identical with *Aranea maculata*, Fabr. (*A. longipes*, Fabr., and *Nephila maculata*, Leach), as well as with *N. imperialis*, Dol. I have myself received it from several parts of a wide exotic area, including Ceylon, Bombay, Manilla, Labuan, Hongkong, and Celebes; Mr. Brown's examples now add another locality to those already recorded. In all of these localities it appears to be an abundant Spider. I have, however, only as yet received the male from Manilla, Labuan, and Ceylon. This sex is so minute (scarcely measuring more than two lines in length, while the female reaches as much as two inches and even more) and is so unlike the female in form, colours, and structure, that it is probably on these accounts overlooked by collectors who have not had their attention specially called to the fact of this great disparity between the sexes.

Genus ARGIOPE, Sav.

ARGIOPE BROWNI, sp. n.

Adult female, length very nearly 9 lines.

The *cephalothorax* is as long as broad, the thorax nearly round, broader than long; the caput is suddenly and strongly constricted laterally, and projects forward. The upper surface is flat, and its colour is dark brown; the occipital region, that of the four central eyes, and a longitudinal stripe running from them to the occiput are brownish orange-yellow; the sides (towards the margins) are covered with small tubercular granulosities; and the normal converging indentations are covered with light-grey adpressed hairs; the stripes of grey thus formed converge to the thoracic indentation, which is large and deep, and give the cephalothorax a very distinctly radiated appearance. There are other hairs also; but these are the chief.

The *eyes* of the four central and lateral pairs are seated on strong tubercular prominences and (looked at from the front) in a straight line. They are all small and do not differ very much in size; the four central eyes form a quadrangular figure whose fore side is shorter than the hinder one, and its longitudinal considerably longer than its transverse diameter; the interval between the eyes of the fore central pair rather exceeds a diameter; and the height of the clypeus is less than half that of the facial space.

The *legs* are long and tolerably strong, of a dark reddish yellow-brown colour, furnished with hairs, bristles, and spines: the hairs and bristles appear to be most numerous underneath the tibiæ; but



the examples received had been subjected to so much maltreatment that the armature and clothing of the legs were almost destroyed.

The *palpi* are moderate in length and strength, and are apparently similar in colour and armature to the legs.

The *fulces* are tolerably long and strong, straight, perpendicular, rounded (in profile) towards their base in front, and similar in colour to the cephalothorax, though perhaps of a rather duller hue.

The *maxillæ* are of normal form, of a deep blackish red-brown colour, with a pale anterior margin.

The *labium* is short, somewhat rounded at the apex, of an orange-yellow colour, paler at the apex, and with a deep reddish-brown patch on each side.

The *sternum* is somewhat heart-shaped and of an orange-yellow colour, clothed with greyish hairs.

The *abdomen* is large, of a rather flattened form, truncated before, broadest across the middle, behind which, on each side, are three largish rounded lobes giving the margins of the hinder extremity a strongly sinuous appearance; the hinder extremity is also lobi-form, and beneath it to the spinners, over which it projects considerably, the surface is strongly rugulose. The upperside is dark dull brown thickly covered with rather yellowish or whitish cretaceous spots, as far as the second marginal lobes, behind which the colour is yellowish brown, spotted thinly with pale spots; the posterior half of the abdomen exhibited traces of variously shaped patches (apparently symmetrical in their uninjured state) of white, silky pubescence; the sides are a mixture of yellow-brown, dark brown, and black, spotted with yellowish, as well as with patches and lines of greyish hairs. The underside is deep brown, with a broad yellow marginal band edged outside with a whitish border, which encircles the areas of the spinners, and has two lateral projecting portions on each side between the spinners and the genital aperture; this last consists of two oval openings, one on each side, in front of a largish, transverse, oval, nearly black prominence. The fore half of the upperside has six impressed blackish spots, in three transverse pairs succeeding each other in a longitudinal direction.

The above description has been collected from the fragments of four examples; it cannot, therefore, be looked upon as altogether satisfactory, though there will be found sufficient distinctive specific characters to render the species recognizable. In its perfect state it is probably a very beautiful spider, and is allied to, though quite distinct from the common South-American species *Argiope argentea*, Fabr.

#### Family GASTERACANTHIDES.

##### Genus GASTERACANTHA.

##### GASTERACANTHA PANISICCA.

*Gasteracantha panisicca*, Butler, Trans. Ent. Soc. Lond. May 1873, p. 162, pl. iv. fig. 14.

Two females of this distinct Spider were contained in Mr. Brown's

collection. The examples from which Mr. Butler's description was made were dried, and consequently had lost the characteristic colours and markings of the abdomen. The upperside of this part is orange-yellow, with a very broad nearly black transverse band on the fore extremity, having, however, a narrow orange margin in front of it, but comprising the ordinary boss-like markings on the anterior margin: these, as well as the rest of the markings, are of a deep red-brown colour, as are also the six abdominal spines, of which the two posterior pairs are of a brilliant deep purple and magenta metallic hue. The underside is black, studded thickly with minute shining tubercles, and blotched sparingly with reddish orange-yellow spots and patches.

The *sternum* is black with a large, round, very conspicuous, reddish orange-yellow spot in the centre.

The *cephalothorax* and *falces* are of a rich black, and the *legs* of a black-brown colour.

#### Family THOMISIDES.

Genus SAROTES, Sund., = OLIOS, Walck., ad partem.

SAROTES VULPINUS, sp. n.

Adult female, length very nearly 10 lines.

The *cephalothorax* is longer than broad, round-oval behind, and constricted laterally at the caput; its colour is a foxy yellowish red, paler at the occiput, and with an indistinct longitudinal central line on the middle part of the caput; and the surface is clothed with greyish sandy hairs.

The *eyes* are in two transverse lines, the foremost straight, the hinder one slightly curved, the convexity of the curve directed backwards. They are of the same colour as the cephalothorax; the four lateral eyes are seated in front of a tubercle and are considerably the largest of the eight; the rest scarcely appear to differ in size. Those of the posterior row are separated by equal intervals of nearly about two diameters' extent; the interval between the fore centrals is equal to a diameter, and each is very near but contiguous to the fore lateral eye on its side. The height of the middle of the clypeus is equal to the diameter of one of the fore central eyes: the interval between the eyes of each lateral pair is equal to the diameter of the fore lateral eye; and the fore central eyes form a square whose anterior side is the shortest, and its longitudinal rather greater than its transverse diameter.

The *legs* are long, strong, furnished with hairs, bristles, and strong spines, and of a yellow-brown colour. All have the tarsi and metatarsi covered with a scopula or pad of close-set hairs on the underside. Their relative length is 2, 1, 4, 3. Those of the first and second pairs are much the longest; but there is not much difference between them; and this is also the case with those of the third and fourth pairs.

The *palpi* are moderate in length and strength, similar to the

legs in colour and armature, and furnished with a scapula beneath the digital joints.

The *falces* are tolerably long and strong, of a darker hue than the cephalothorax, straight but sloping on their inner sides towards the extremity, where they are furnished with long reddish hairs.

The *maxillæ* are rather long and strong, broadest towards their extremity, where they are rounded, straight, but inclined slightly to the labium; they are of a reddish yellow colour, palest at their fore extremity, where they are furnished thickly with a fringe of strong reddish hairs.

The *labium* is of a somewhat oblong form, half the length of the maxillæ, with a convex outer surface and truncated at the apex, its colour being similar to that of the maxillæ.

The *sternum* is heart-shaped, paler-coloured than the labium, and clothed with hairs.

The *abdomen* is oblong-oval, tolerably convex above, rather broad behind, rounded at the posterior extremity, and truncated before; it is clothed with brown, greyish-sandy, and yellow-brown hairs, and is of a foxy yellow-brown colour, margined above with a broad but not very clearly defined dull yellowish border; the greater part of the underside is occupied by a large vase-shaped dark red-brown area, the fore extremity of which has a whitish-yellow border; the spinners are short, those of the superior pair the strongest. The genital aperture is small, much obscured by hairs, but apparently somewhat crescent-shaped.

A single example in the Rev. G. Brown's collection.

#### 4. Notes on the Anatomy of the Musk-Deer (*Moschus moschiferus*). By A. H. GARROD, M.A., F.R.S., Prosector to the Society.

[Received March 3, 1877.]

In the large collection of living animals brought home by the Prince of Wales from India were two male specimens of the Musk-Deer (*Moschus moschiferus*), nearly adult, from Nepaul, presented to His Royal Highness by Sir Jung Bahadoor, whose sudden death has been so recently announced. As far as I am aware, the only other individual of the species which had been seen alive in this country, was the female presented by Sir Richard Pollock, K.C.S.I., on March 31st, 1869, to this Society, which formed the subject of Professor Flower's valuable memoir published in our 'Proceedings' (1875, p. 159).

On Feb. 2nd of this year one of the Prince's specimens died at Sandringham; and His Royal Highness having graciously given permission that a post-mortem might be made upon it, Mr. Clarence Bartlett placed it in my hands.

Pathologically it did not present any features of special interest,

the only organ which gave any proof of lesion being the psalterium, in which several minute abscesses were found along the attached margins of several of the laminae.

Zoologically the specimen has given me the opportunity of verifying many of the statements both of Pallas in his exhaustive treatise on the animal<sup>1</sup>, and of Prof. Flower in his memoir above referred to. My own attention having been much devoted of late to the anatomy of the Ruminantia, I was particularly pleased at having the opportunity of dissecting the species, especially as it was of the male sex, and as Prof. Flower has most kindly allowed me to compare its viscera with those of the female specimen in the Museum of the College of Surgeons.

Considering the various organs seriatim, I found that the tongue greed exactly with that figured by Prof. Flower, as did the epiglottis in being pointed in the middle line, and the stomach in its general configuration.

In the *rumen* the villi were shorter than in most of the Cervidae and more sparsely scattered. There were no traces of any special glandular pouch on the anterior wall of the viscus.

In the *reticulum* the shallow cells were peculiar in being comparatively small, and more numerous than is generally the case.

The *psalterium* did not differ, except in the number of its lamellae, from the description given by Pallas; and it appears to me that Prof. Flower, at the same time that he was the first to lay proper stress upon its uon-typical nature, hardly read correctly the account given by the earlier observer; for in the College specimen, although the rows of papillae are particularly feeble, nevertheless it might be said of them "inter majores laminas rugae intercalares, vel lamellulae accessoriae angustiores." In the stomach under consideration they are much more conspicuous. The organ is therefore duplicitate, and differs from that of any other Ruminant examined by me, as I have elsewhere shown<sup>2</sup>, in that the lamellae are arranged more closely than is usually the case, and at the same time there is a great deficiency in minor folds, and an excess of those of higher degree.

Pallas counted 23 or 25 major lamellae in the psalterium of his specimens; Prof. Flower, 19 in his; there were 21 in the specimen now under consideration.

The small intestine was 24 feet 2 inches in length, the large intestine measuring 11 feet 9 inches, and the caecum  $5\frac{1}{2}$  inches. There were three and a half double turns in the colic coil, which is one more than is generally found in larger species, and two more than is frequently observed in smaller ones. Both the caecum and the colon were curiously mottled from the collection of fat in the course of the vessels traversing their surface, as is mentioned by Pallas, and shown in his figure of the former organ.

With reference to the peculiar dilatation of the colon in the region of the ileo-caecal valve, this is produced by the considerable development of a glandular surface, which is quite as well marked in the Giraffe (*Camelopardalis giraffa*), as was first pointed out by Dr. T.

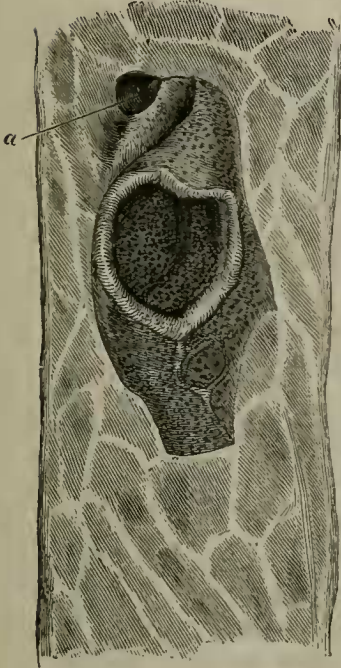
<sup>1</sup> Spicilegia Zoologica, fasciculus xiii. (1779).

<sup>2</sup> *Antea*, p. 8.



S. Cobbold, in his article "Ruminantia," in the Cyclopædia of Anatomy and Physiology<sup>1</sup>, where it is excellently figured, as it is also by the same author, although much less accurately, in the 'Proceedings'<sup>2</sup> of this Society. I take the present opportunity of depicting its condition in *Moschus*, and have had placed side by side with it a drawing of the homologous gland in the Fallow Deer (*Cervus dama*), where it is comparatively smaller (figs. 1, 2). This gland is pro-

Fig. 1.



Ileo-cæcal gland of *Moschus* :  
a, orifice of small intestine.

Fig. 2.



Ileo-cæcal gland of *Cervus dama* : a, orifice  
of small intestine.

bably to be found in other members of the Order ; but I regret that till quite recently, not having had my attention specially called to it, I have not taken the opportunity of looking for it. In future I will do so, and will inform the Society of the results of my search<sup>3</sup>. I could find no Peyer's patches.

The liver was more elongate and not so deep as that figured by Prof. Flower. The gall-bladder was lodged in a shallow fossa, its fundus not nearly reaching the free margin of the organ. The caudate lobe was lateral, and far from large. The spigelian lobe was absent—a fact which demonstrates, what specimens of *Cephalophus pygmaeus* and *Camelopardalis giraffa* had previously taught me, the

<sup>1</sup> Vol. v. p. 540, fig. 363.

<sup>2</sup> P. Z. S. 1860, p. 104, pl. lxxviii.

<sup>3</sup> Since this paper was read I have examined the ileo-cæcal region of the colon in *Alces machlis*, where the gland is large and very much like that of the Giraffe—in *Cervus virginianus*, where it is oval, made up of shallow glands, and an inch long—and in *Tragelaphus scriptus* and *Oryx beisa*, where it agrees with that in *C. virginianus*.

variable nature of this small hepatic appendage, even in the same species.

With reference to the generative organs, Pallas records the existence of Cowper's glands and a filiform termination to the urethra, of some length. I take the opportunity of figuring the glans penis, as the drawings given by Pallas, although particularly instructive, are too small to exhibit some of its characteristics (fig. 3). The glans,

Fig. 3.



Glans penis of *Moschus*.

on the whole, is more like that in the genera *Gazella* and *Addax*<sup>1</sup> than in *Ovis*, *Capra*, *Cephalophus*, and *Camelopardalis*, in all of which there is a filiform termination to the urethra. The Cowper's glands were about the size and shape of haricot beans, one on each side. The vesiculæ seminales were each an inch long, and of a fairly uniform breadth of  $\frac{1}{4}$  inch. The urethral ends of the vasa deferentia were considerably dilated for a little more than an inch and a half.

As has been clearly described by Pallas, the musk-sac opens a short distance in front of the preputial opening; its size is nearly that of an ordinary orange. In the specimen under consideration it was filled with a dark-brown, chocolate-coloured powder, possessing, most powerfully, the characteristic odour. Its minute orifice was a little more than half an inch in front of the opening of the prepuce, from which latter a few stiff hairs, about half an inch long, projected forwards and downwards. The two orifices were included within a common sphincter muscle, the skin over which was covered with fine hairs, all radiating towards its centre. The slightly convex cutaneous surface included within the sphincter was devoid of hair. This account agrees with that of J. F. Brandt and J. C. T. Ratzeburg in 1839<sup>2</sup>; and my specimen in no way differs from the excellent figures of the musk-sac given by those authors.

In my paper on the visceral organs of the Ruminantia<sup>3</sup>, I have drawn special attention to the nature of the internal surface of the uterus in the Order, having given strong reasons for the surmise that the Cavicornia are characterized by having numerous cotyledons on the placenta, on which account they are termed *Polycotyledontophora*, whilst in the Cervidæ (therefore termed *Oligocotyledontophora*) the cotyledons are very few in number. It occurred to me that the nature of the interior of the uterus or the placenta would throw much light on the very disputed point as to the affinities of *Moschus*. Of the placenta Pallas tells us<sup>4</sup> that "*cotyledones et respondentur placentalæ oblonga, plana figura gaudent et in series fere digeruntur.*

<sup>1</sup> *Vide antea*, p. 10, fig. 18.

<sup>2</sup> *Medicinische Zoologie* (Berlin, 1839), Band i. pp. 41-51, pl. 8.

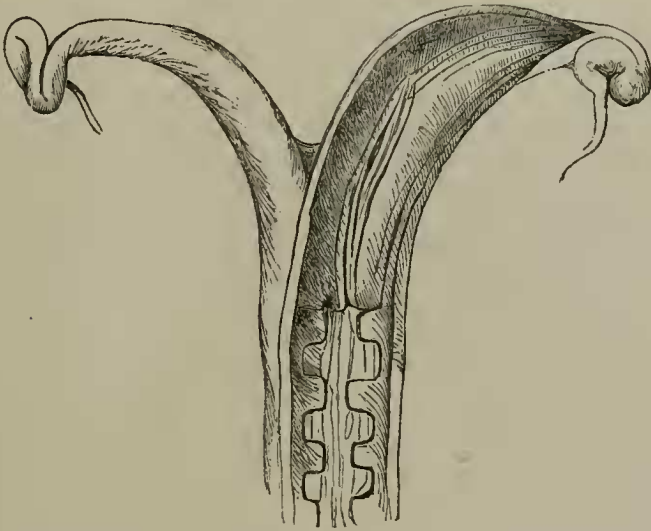
<sup>3</sup> *P. Z. S. antea*, p. 12.

<sup>4</sup> *Loc. cit.* p. 41.

Extrema secundinarum attenuata, in cornua uteri filo protensa; at versus orificium uteri chorion utriusque anastomosi tubulari cohæret." At the same time he tells us that there were two fœtuses in the uterus.

Prof. Flower has kindly allowed me to examine the uterus of the specimen of *Moschus moschiferus* in the College-of-Surgeons Museum, which was about  $2\frac{1}{2}$  years old. From it fig. 4 is taken. It will be

Fig. 4.



Uterus of *Moschus moschiferus*: the left cornu is opened up longitudinally.

seen that there are no cotyledonary papillæ at all, the mucous membrane being disposed in narrow longitudinal folds, six in number, of very little depth, running nearly the whole length of the cornua, slightly broken here and there, but nowhere developing from their free edges the tongue-like processes which form the cotyledonary papillæ in ordinary Deer, or the characteristic linearly arranged elevations of the Bovidæ. This condition differs from any I have seen in other Ruminant animals; and I can find no reference to it by other authors.

I do not think that my account of the organ is at all incompatible with that of Pallas, who has laid special stress on the linear nature of the cotyledons. Neither in the Cervidæ nor the Cavicornia have I ever found an arrangement which can be compared with it. I do not feel justified in regarding it as indicating a nearer relationship to the one than to the other; for the number of the plications is opposed to Cervine affinities, whilst their size militates against their polycotyledonary nature.

When we consider the genus *Moschus* in its relations to the other



Ruminants, it seems to me that to call it a Deer is altogether against the tendency of the facts at our disposal. No known Deer has a gall-bladder, or a filiform termination to its urethra. How can we place with the Cervidæ, therefore, an animal which possesses both?

5. Remarks on the Affinities of *Mesites*. By EDWARD BARTLETT, Esq., Curator of the Maidstone Museum.

[Received March 7, 1877.]

Some months ago I received a small collection of Mammals and Birds obtained on the south-east coast of Madagascar by Mr. Thomas Waters. Among them was a fine pair of specimens of *Mesites variegata*, which are now in the collection of Mr. R. J. Balston. Having examined the two skins of this rare bird very carefully, and not feeling satisfied that the genus has been arranged in its proper group by former systematists, I venture to lay before the Society the following notes, trusting that they may lead to a more careful investigation of the affinities of *Mesites*, and of the position which it should take in a natural classification.

In the Zoological Society's 'Proceedings' for 1861, my father (Mr. A. D. Bartlett) first pointed out the affinities of *Balæniceps*, *Eurypyga*, and *Cancroma*, as evidenced by their "powder-down patches." Now, strange to say, while examining the skins of *Mesites*, I discovered two of these patches very distinct on the back of the neck. This naturally led me to search for others, which, to my surprise, I found—one on each side of the lower part of the rump, close to the tail, one on each side of the upper part of the pectoral muscles, a third pair, one on each side, running across the ribs, on to the pectoral muscle, and a fourth pair, one on each side of the abdominal region, running parallel with the vent, making in all five pairs of powder-down patches. This exceeds the number found in *Cancroma* (which has four pairs) by one pair, the extra pair being those placed across the ribs.

I have examined skins of *Eurypyga helias*, and have found other characters which confirm my opinion that *Mesites* is an aberrant form of the Ardeine group.

The bill is like that of *Eurypyga*, long and slender, the nostrils reaching more than half the length; the wings are rounded; the legs long, slender, and naked above the tarsus. This is the case in *Eurypyga* and all the Herons, although in other respects *Mesites* is very Thrush-like<sup>1</sup>.

Another, and one of the most peculiar characters with regard to *Mesites* and *Eurypyga*, is that the quills of the soft feathers on the back and rump are extremely fine and delicate in the centre, which causes the tip of each feather to turn the reverse way directly the

<sup>1</sup> The legs are represented in Gray's 'Genera of Birds' as feathered to the tarsus, which is wrong; in the specimens before me they are naked and scaly  $\frac{3}{4}$  inch up the tibia.





R. Mintern, del.

SALMO ARCTURUS

Mintern Bros. imp

bird is dead. This fact I have often noticed while preparing the skins of *Eurypyga helias*; and it is exactly the same with the feathers of *Mesites variegata*.

I therefore suggest that the genus *Mesites* should be arranged in the Natural System next to *Eurypyga* and its near ally *Rhinochetus*.

I may add that on examining the powder-down under a glass, I find the structure of that of *Mesites* nearly identical with that of *Ardea cinerea*.

6. Account of the Fishes collected by Capt. Feilden between 78° and 83° N. lat., during the Arctic Expedition 1875-6.  
By Dr. ALBERT GÜNTHER, F.R.S.

[Received March 20, 1877.]

(Plate XXXII.)

1. *COTTUS QUADRICORNIS*, L.

A young specimen, 4 inches long, was found dead by Mr. Egerton on the beach in Dumbell Harbour (lat 82° 30'). No other salt-water fish is known at present to have been found at a higher latitude. In this young specimen the nuchal tubercles are only indicated; but having compared it with a specimen obtained on the English coast, another from Lake Wettern, and with two from Sir J. Richardson's collection (the locality of which is not known, but which most probably were given to him by one of the previous arctic explorers), I have no doubt as to their specific identity. Dr. Lütken has excluded this species from his list of Greenland fishes ('Arctic Manual,' p. 116).

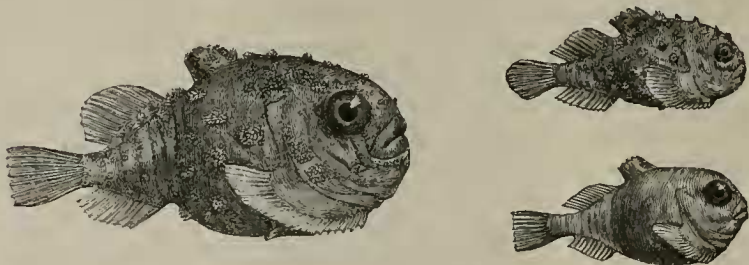
2. *ICELUS HAMATUS*, Kröyer.

Previously known from Spitzbergen and Greenland, seems to be one of the most common fishes in the latitudes between 80° and 82°. Two specimens were obtained at Discovery Bay (81° 44'), three at Franklin-Pierce Bay (in 15 fathoms), and seven at Cape Napoleon. All these specimens were caught in the month of August, and were ready for spawning.

3. *CYCLOPTERUS SPINOSUS*, Müll.

Previously known from Iceland, Spitzbergen, and Greenland. Two specimens from Cape Napoleon, and four from Franklin-Pierce Bay are all young, and interesting as showing the irregular manner in which the conical spines are developed. The largest of these young specimens is not quite 2 inches long; and the tubercles are much less numerous than in an adult specimen; it is rough, and covered with minute spines. In a specimen 15 lines long only traces of the tubercles are visible on the skin. A specimen 12 lines long is quite naked, whilst another of the same size has the tubercles as much de-

veloped as the largest, or even more so. The spines of the first dorsal fin are sometimes quite distinct, sometimes enveloped in loose skin.



*Cyclopterus spinosus.*

4. *LIPARIS FABRICII*, Kröyer.

Previously known from Spitzbergen, Greenland, Fort Leopold; is represented in the present collection by a specimen from Discovery Bay, and another from Franklin-Pierce Bay.

5. *GYMNELIS VIRIDIS*, Fabr.

One specimen, obtained in lat.  $81^{\circ} 52'$ ; it is only 5 inches long, and belongs to a highly coloured variety, being brown with numerous white spots, and having four black ocelli on the dorsal fin.

6. *GADUS FABRICII*, Rich.

Widely distributed in the arctic regions of the western hemisphere. One specimen, obtained off Cape Hayes, Grinnell Land.

7. *SALMO ARCTURUS*, sp. n. (Plate XXXII.)

The northernmost Salmonoid known at present.

This Charr cannot be identified with any of the other races of this division of *Salmo*; it comes nearest to the Charr of Killin (Inverness-shire), but differs from it in having a more slender body, rather smaller scales, shorter fins, and a less number of pyloric appendages.

Body rather elongate; head small, two ninths or nearly one fifth of the total length (without caudal), scarcely more than one half of the distance between the snout and the vertical from the origin of the dorsal fin. The snout is remarkably obtuse; the maxillary varies in length: in males of the same size it sometimes reaches scarcely to, sometimes a little behind, the hind margin of the orbit; in the female it is smaller and shorter. Teeth small; vomerine teeth limited to the anterior extremity of the bone; a band of villiform teeth along the middle of the hyoid bone. Præoperculum with a distinct lower limb; suboperculum about twice as long as deep; pectoral but little shorter than the head, exceeding in length one half of the distance of its root from the ventral. Ventral terminating at a considerable distance from the vent. D. 13, the longest ray as long as the head (without snout). A. 12. Caudal moderately excised, its middle rays half the length of the outer ones. Scales minute. Branchiostegals 11.

Upper parts of a dull brownish green, passing on the sides into the silvery or reddish colour of the lower parts. Dorsal and caudal







colko

2

1/7

J G Keulemans lith

M & N Hanhart del

1 ZOSTEROPS ANJUANENSIS  
2 TCHITREA VULPINA







4  
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